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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,871	09/29/2003	Steven R. Lowe	TUC920030101US1	6311

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EXAMINER

BARTON, JONATHAN A

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/674,871	Applicant(s) LOWE ET AL.	
	Examiner Jonathan Barton	Art Unit 2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-30 is/are rejected.
- 7) ☐ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/29/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 4 (the second claim 4) is objected to because of the following informalities: Claims must all have their own distinct claim numbers. The second claim 4 should be changed to claim 5. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 12, 13, 21, 22, 29, and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. These claims all claim either mode 2 or mode 3, which is defined in the specification as "destage to write request ratio of 2 (or 3)". Without this detail the claim is rendered indefinite.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, 7-11, 14, 16-20, 23-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ofer (US 6,189,080).

a. As for claims 1 and 23 Ofer discloses

- i. allocating a predetermined portion of a temporary storage to each of the plurality of ranks (Col. 1 Lines 9-19);
- ii. establishing an initial destage mode whereby data is destaged from a portion of the temporary storage to the corresponding rank at a predetermined rate relative to the rate at which host write requests are processed and stored in the temporary storage (Col. 3 Lines 7-12);
- iii. destaging a data update from the temporary storage to a target rank (Col. 1 Lines 16-19);
- iv. evaluating workload conditions of the temporary memory (Col. 4 Lines 26-36); and
- v. modifying the destage mode in response to the evaluation (Col. 4 Lines 26-36).

b. As for claim 4 Ofer discloses

- vi. Evaluating the workload conditions comprises determining if the temporary storage is receiving host write requests faster than stored data updates are destaged (Col. 4 Lines 43-49, 62-66)

c. As for claims 7, 17 and 25 Ofer discloses

- vii. Evaluating the workload conditions comprises evaluating path-length processes (Col. 4 Lines 15-25).

Art Unit: 2186

- d. As for claims 8, 18 and 26 Ofer discloses
 - viii. The initial destage mode is 0, whereby no correlation is present between the number of destages required before a new write request is processed (Col. 4 Line 37 – Col. 5 Line 31: There is no data to calculate a write frequency initially and therefore no changes in response to the write rate will be made).
- e. As for claims 9, 19, and 27 Ofer discloses
 - ix. Evaluating the workload conditions comprises evaluating whether a backlog is in danger of being created (Col. 3 Lines 13-33, Col. 4 Lines 1-9, 28-33).
- f. As for claims 10, 20 and 28 Ofer discloses
 - x. Modifying the destage mode comprises changing the destage mode to 1 if a backlog is in danger of being created (Col. 1 Line 66 – Col. 2 Line 5).
- g. As for claim 11 Ofer discloses
 - xi. Evaluating the workload conditions comprises evaluating whether a backlog is present (Col. 3 Lines 13-33, Col. 4 Lines 1-9, 28-33).
- h. As for claim 14 Ofer discloses
 - xii. a temporary storage having predetermined portions each of which is allocated one of the plurality of ranks (Col. 1 Lines 9-19);
 - xiii. means for processing write requests received from a host device (Col. 2 Lines 53-61);

Art Unit: 2186

- xiv. means for directing that data update associated with each write request be stored in-one of the predetermined portions of the temporary storage (Col. 1 Lines 9-19); and
 - xv. means for directing that each data update be destaged from the predetermined portion to the corresponding rank at a predetermined destage rate relative to the rate at which write requests are processed and stored in the temporary storage (Col. 3 Lines 7-12);
 - xvi. means for evaluating workload conditions of the temporary memory (Col. 4 Lines 26-36); and
 - xvii. modifying the destage rate in response to the evaluation (Col. 4 Lines 26-36).
- i. As for claim 24 Ofer discloses
- xviii. The instructions for evaluating workload conditions comprises instructions for evaluating the capacity of the temporary storage (Col. 4 Lines 1-9).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ofer (US 6,189,080) in view of Beardsley et al. (US 6,141,731).

j. As for claim 2 Ofer discloses the depended up on claim 1, but fails to disclose the following limitation which is taught by Beardsley:

xix. The temporary storage comprises: a cache memory (Col. 2 Lines 40-41, 45-46); and a non-volatile storage memory (NVS) (Col. 2 Lines 54-59); and

xx. Destaging a data update comprises destaging the data update from the NVS (Col. 2 Lines 54-59).

k. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the NVS temporary memory taught by Beardsley with the disk cache system disclosed by Ofer because both systems offer temporary storage of data to be written to a disk storage system and destage this data from the temporary storage location to the disk location and the utilization of an NVS provides extra data loss protection in such a system.

l. As for claims 3 and 16 Beardsley teaches

xxi. Evaluating the workload conditions comprises evaluating the capacity of the NVS (Col. 2 Lines 54-55) (Also: Ofer – Col. 4 Lines 1-9).

m. As for claim 15 Beardsley teaches

xxii. The temporary storage comprises a non-volatile storage memory (NVS) (Col. 2 Lines 54-59).

Allowable Subject Matter

5. Claims 5, 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

n. Claim 5 (and therefor the dependent claim 6) contains at least the following allowable subject matter:

xxiii. The initial destage mode comprises a destage to write request ratio of 3.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

o. Milillo et al. (US 6,345,338) – Col. 6 Lines 8-46.

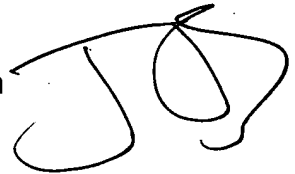
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Barton whose telephone number is 571-272-8157. The examiner can normally be reached on Monday - Friday 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2186

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jonathan Barton
Examiner
Art Unit 2186



JB



MATTHEW D. ANDERSON
PRIMARY EXAMINER